CLAIMS

I claim:

1. An amyloid fibril substantially free of other protein.

2. A fibril according to claim 1 which is a naturally occurring amyloid fibril.

3. A fibril according to claim 2 which comprises the Aβ peptide associated with Alzheimer's disease, the prion protein associated with the transmissible spongiform encephalopathies, the islet-associated polypeptide associated with type II diabetes, transthyretin and fragments thereof associated with senile systemic amyloidosis, transthyretin variants and fragments thereof associated with familial amyloidotic polyneuropathy or other variant, truncated, or misprocessed proteins associated with the systemic amyloidoses.

4. A fibril according to claim 1 which comprises a pharmaceutically active compound.

5. A fibril according to claim 1 which comprises a metal.

6. A fibril according to claim 1 which comprises a metal selected from copper, silver or gold.

7. A fibril according to claim 1 which comprises one or more functional groups capable of binding one or more reactants.

8. A fibril according to claim 1 wherein the diameter of the fibril is from 1 to 20 nm.

9. A fibril according to claim 1 wherein the diameter of the fibril is from 5 to 15 nm.

10. A fibril according to claim 1 wherein the diameter of the fibril is from 7 to 12 nm.

11. A non-naturally occurring amyloid fibril comprising a protein.

12. A fibril according to claim 11 wherein the protein is a non-naturally occurring protein.

13. A fibril according to claim 11 wherein the protein is selected from the group consisting of an SH3 domain (PI3-SH3) of a p85α subunit of bovine phosphatidylinositol 3-kinase, human muscle acylphosphatase, bovine insulin, a protein corresponding to the first two (CspB-1), the first three (CspB-2) or the last two (CspB-3) β strands of CspB, the wild type human carboxypeptidase A2 (WT-ADA2h) and derivatives or amino acid variants thereof.

14. A non-naturally occurring amyloid fibril comprising an SH3 domain (PI3-SH3) of a p85α subunit of bovine phosphatidylinositol 3-kinase and at least one protein selected from the proteins as described in claim 13.

15. A fibril according to claim 11 which further comprises a pharmaceutically active compound.

16. A fibril according to claim 11 which further comprises a metal.

17. A fibril according to claim 11 which further comprises a metal selected from copper, silver or gold.

18. A fibril according to claim 11 which further comprises one or more functional groups capable of binding one or more reactants.

19. A fibril according to claim 11 wherein the diameter of the fibril is from 1 to 20 nm.

20. A fibril according to claim 11 wherein the diameter of the fibril is from 5 to 15 nm.

21. A fibril according to claim 11 wherein the diameter of the fibril is from 7 to 12 nm.

22. A process for preparing an amyloid fibril, which process comprises:

preparing a solution comprising a protein, said solution being in a state so that nucleation and fibril growth will occur over an acceptable time, and

allowing nucleation and fibril growth to take place.

23. A process according to claim 22 wherein the solution further comprises an alcohol.

24. A process according to claim 22 wherein the solution further comprises alcohol selected from methanol, ethanol, propanol, butanol, trifluoroethanol and hexafluoroisopropanol.

25. A process according to claim 22 wherein the solution further comprises acetonitrile.

26. A process according to claim 22 wherein the solution further comprises urea.

27. A process according to claim 22 wherein the concentration of protein in the solution is from 0.1 mM to 10 mM.

28. A process according to claim 22 wherein the temperature of the solution is from 0°C to 100°C.

29. A process according to claim 22 wherein the solution is acidic.

30. A process according to claim 22 wherein the pH of the solution is from 0.5 to 6.5.

31. A process according to claim 22 wherein the solution is seeded with previously formed particles of protein.

32. Use of a fibril according to claim 1 as a plastic or in electronics or catalysis.

33. Use of a fibril according to claim 11 as a plastic or in electronics or catalysis.

34. A method of treating a human or animal, which method comprises administering thereto a non-toxic and effective amount of a fibril as claimed in claim 1.

35. A method according to claim 34 wherein the human or animal is suffering from or susceptible to diabetes, blood clotting disorders, cancer or heart disease immediately prior to the administering.

36. A method of treating a human or animal, which method comprises administering thereto a non-toxic and effective amount of a fibril as claimed in claim 11.

37. A method according to claim 36 wherein the human or animal is suffering from or susceptible to diabetes, blood clotting disorders, cancer or heart disease immediately prior to the administering.

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